DETAILED ACTION

Response to Decision on Appeal

1. This office action is in response to a decision from the Board of Patent Appeals and Interferences filed on 6/16/2010.

2. Claims 1, 6, 17-26, 31 and 42-50 have been reversed.

3. Claim 16 remains cancelled.

4. Claims 2-5, 7-15, 27-30 and 32-41 were objected to as being dependent upon a rejected base claim. However since claims 1, 6, 17-26, 31 and 42-50 have been reversed, claims 2-5, 7-15, 27-30 and 32-41 are allowable, as discussed below.

Summary of Interview

Due to the cancellation of original claim 16, the applicant's representative, John Buckhert, authorized examiner's amendments on Auguts 25, 2010 to amend original claims 17-50 to be renumbered as 16-49.

Examiner's Amendment

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with John Buckert on August 25, 2010.

Amend original claims 17-50 as follows:

~~17~~16. The method of claim 1, wherein scanning the internal anatomy of the person comprises monitoring a position on a chest of the person during respiration by the person to determine the time period of the respiratory cycle of the person.

~~18~~17. The method of claim 1, wherein the at least a portion of the internal anatomy of the person comprises a tumor.

~~19~~18. The method of claim 1, wherein the plurality of cross-sectional digital images comprises a plurality of computerized tomography images.

~~20~~19. The method of claim 1, wherein the plurality of cross-sectional digital images comprises a plurality of magnetic resonance images.

~~21~~20. The method of claim 1, wherein the first and second 3-D digital images comprises first and second 3-D computerized tomography images, respectively.

~~22~~21. The method of claim 1, further comprising displaying at least a portion of the resultant 3-D digital image on a display monitor.

~~23~~22. The method of claim 1, further comprising displaying a 2-D portion of the resultant 3-D digital image on a display monitor.

~~24~~23. The method of claim 1, further comprising:

color coding a portion of the resultant 3-D digital image; and

displaying the color-coded resultant 3-D dicta1 image on a display monitor.

~~25~~24. The method of claim ~~24~~23, wherein the color-coded resultant 3-D digital image is generated using a volume rendering display technique.

~~26~~25. A system for generating a digital image indicative of an internal anatomy of a person, comprising:

a respiratory monitoring device generating a first signal indicative of a respiratory state of the person;

a scanning device configured to scan internal anatomy of the person to Obtain scanning data; and

a computer operably coupled to both the respiratory monitoring device and the scanning device, the computer configured to generate a plurality of cross-sectional digital images based on the scanning data, the computer further configured to generate first and second cross-sectional digital image groups associated with the first and second respiratory states, respectively, of the person, the first cross-sectional digital image group including first and second digital images of the plurality of cross-sectional digital images obtained at first and second positions, respectively, along the axis, when the person has the first respiratory state, the second cross-sectional digital image group including third and fourth digital images of the plurality of cross-sectional digital images obtained at third and fourth positions, respectively, along the axis, when the person has the second respiratory state, the computer further configured to generate first and second 3-D digital images utilizing the first and second cross-sectional digital image groups, respectively, the computer further configured to generate a resultant 3-D digital image indicating at least a portion of the internal anatomy of the person utilizing the first and second 3-D digital images, the computer further configured to store the resultant 3-D digital image in a memory device.

~~27~~26. The system of claim ~~26~~25, wherein the computer is further configured to perform a minimum intensity projection of the first and second 3-D digital images to obtain the resultant 3-D digital image.

~~28~~27. The system of claim ~~27~~26, wherein the resultant 3-D digital image comprises a first region having a first plurality of voxel intensity values indicative of a tumor and a second region having a second plurality of voxel intensity values indicative of the internal anatomy surrounding the tumor, wherein each of the first plurality of voxel intensity values are less than each of the second plurality of voxel intensity values,

~~29~~28. The system of claim ~~26~~25, wherein the computer is further configured to perform a a maximum intensity projection of the first and second 3-D digital images to obtain the resultant, 3-D digital image.

~~30~~29. The system of claim ~~29~~28, wherein the resultant 3-D distal image comprises a first region having a first plurality of voxel intensity values indicative of a tumor and a second region having a second plurality of voxel intensity values indicative of the internal anatomy surrounding the tumor, wherein each of the first plurality of voxel intensity values are greater than each of the second plurality of voxel intensity values.

~~31~~30. The system of claim ~~26~~25, wherein the computer is further configured to perform an average intensity projection of the first and second 3-D digital images to obtain the resultant 3-D digital image.

~~32~~31. The system of claim ~~26~~25, wherein the computer is further configured to perform a maximum intensity projection of first and second 3-D digital images to obtain a third 3-D digital image;

the computer being further configured to generate a boundary within the third 3-D digital image around a predetermined portion of the internal anatomy of the person;

the computer being further configured to perform a minimum intensity projection of the predetermined portion of the third 3-D digital image to obtain a fourth 3-D digital image; and

the computer being further configured to combine the third 3-D digital image and the fourth 3-D digital image to obtain the resultant 3-D digital image.

~~33~~32. The system of claim ~~32~~31, wherein the resultant 3-D digital image comprises a first region having a first plurality of voxel intensity values indicative of locations of a tumor during at least one respiratory cycle, and a second region having a second plurality o f voxel intensity values indicative o f the internal anatomy surrounding the tumor, the first plurality of voxel intensity values being greater than each of the second plurality of voxel intensity values.

~~34~~33. The system of claim ~~32~~31, wherein the computer is further configured to color code a portion of the resultant 3-D digital image and to display the color-coded resultant 3-D digital image on a display monitor.

~~35~~34. The system of claim ~~32~~31, further comprising displaying the resultant 3-D digital image on a display monitor using a volume rendering technique.

~~36~~35. The system of claim ~~32~~31, further comprising storing, the resultant 3-D digital image in a memory,

~~37~~36. Tile system of claim ~~26~~25, wherein the computer is further configured to perform a minimum intensity projection of the first and second 3-D digital images to obtain a third 3-D digital image;

the computer being further configured to generate a boundary within the third 3-D digital image around a predetermined portion of the internal anatomy of the person;

the computer being further configured to perform, a maximum intensity projection of the predetermined portion of the third 3-D digital image to obtain a fourth 3-D digital image; and

the computer being further configured to combine the third 3-D digital image and the fourth 3-D digital image to obtain the resultant 3-D digital image.

~~38~~37. The system of claim ~~37~~36, wherein the resultant 3-D digital images comprises a first region having a first plurality of voxel intensity values indicative of locations of a minor during at least one respiratory cycle and a second region having a second plurality of voxel intensity values indicative of the internal anatomy surrounding the tumor, the first plurality of voxel intensity values being less than each of the second plurality of voxel intensity values.

~~39~~38. The system of claim ~~37~~36 wherein the computer is further configured to color code a portion of the resultant 3-D digital image, and to display the color-coded resultant 3- D distal image on a display monitor.

~~40~~39. The system of claim ~~37~~36, wherein the computer is further configured to display the resultant 3-D digital image on a display monitor using a volume rendering technique.

[[41]]40. The system of claim ~~37~~36, wherein the computer is further configured to store the resultant 3-D digital image in a memory.

~~42~~41. The system of claim ~~26~~25, wherein the at least a portion of the internal anatomy of the person comprises a tumor.

~~43~~42. The system of claim ~~26~~25, wherein the plurality of cross-sectional digital images comprises a plurality of computerized tomography images.

[[44]]43. The system of claim ~~26~~25, wherein the plurality of cross-sectional digital images comprises magnetic resonance images.

~~45~~44. The system of claim ~~26~~25, wherein the first and second 3-D digital images comprise first and second 3-D computerized tomography images, respectively.

~~46~~45. The system of claim ~~26~~25, wherein the computer is fresher configured to display at least a portion of the resultant 3-D digital image on a display monitor.

~~47~~46. The system of claim ~~26~~25, wherein the computer is further configured to display a 2-D portion of the respirator 3-D digital image on a display monitor.

~~48~~47. The system of claim ~~26~~25, wherein the computer is further configured color code a portion of the resultant 3-D digital image and to display ~le cot or-coded resultant 3-D digital image on a display monitor.

~~49~~48. The system of claim ~~48~~47, wherein the color-coded resultant 3-D digital image is generated using a volume rendering display function.

~~50~~49. An article of manufacture, comprising:

a computer storage medium having a computer program encoded therein for generating a digital image indicative of an internal anatomy of a person, the computer storage medium comprising:

code for inducing a scanning device to scan the internal anatomy of the person at a plurality of positions along an axis to obtain scanning data, wherein the scanning at each position is performed over at least one respiratory, cycle of the person;

code for generating a plurality of cross-sectional digital images based on the scanning data;

code for generating first and second cross-sectional digital image groups associated with the first and second respiratory, states, respectively, of the person, the first cross-sectional digital image group including first and second digital images of the plurality of cross-sectional digital images obtained at first and second positions, respectively, along the axis, the when the person has the first respiratory state, the second cross-sectional digital image group including third and fourth digital images of the plurality of cross-sectional digital images obtained at third and fourth positions, respectively, along the axis, when the person has the second respiratory state;

code for generating first and second 3-D digital images utilizing the first and second cross-sectional digital image groups, respectively;

code for generating a resultant 3-D digital image indicating at 1east a potion of the internal anatomy of the person utilizing the first and second 3-D digital images; and

code for storing the resultant 3-D digital image in a memory device.

Allowable Subject Matter

Original claims 1-15 and renumbered claims 16-49 are allowed. The following is an examiner's statement of reasons for allowance: In regards to claim 1, the prior art Takagi et al.(*US Patent 6,269,140*) teaches a method for generating a digital image indicative of an internal anatomy of a person (*col. 2 lines 53-56*), scanning the internal anatomy of the person at a plurality of positions along an axis to obtain scanning data (*col. 3 lines 21-26*), wherein the

scanning at each position is performed over at least one respiratory cycle of the person (*col. 3 lines 30-33*) and generating a plurality of cross-sectional digital images based on the scanning data (*col. 3 lines 26-30*), generating first and second cross-sectional digital image groups associated with the first and second respiratory, states, respectively, of the person, the first cross-sectional digital image group including first and second digital images of the plurality of cross-sectional digital images obtained at first and second positions, respectively, along the axis, the when the person has the first respiratory state, the second cross-sectional digital image group including third and fourth digital images of the plurality of cross-sectional digital images obtained at third and fourth positions, respectively, along the axis, when the person has the second respiratory state (*col. 6 lines 55-58*), and generating first and second 3-D digital images utilizing the first and second cross-sectional digital image groups, respectively (*col. 6 lines 60-63*). However, the prior art fails to teach generating a resultant 3-D digital image indicating at least a portion of the internal anatomy of the person utilizing the first and second 3-D digital images and storing the resultant 3-D digital image in a memory device. Therefore original claims 1-15 and renumbered claims 16-24 are allowable.

In regards to renumbered claim 25, Takagi et al. teaches a system for generating a digital image indicative of an internal anatomy of a person (*col. 3 lines 34-50*), comprising: a respiratory monitoring device generating a first signal indicative of a respiratory state of the person (*col. 7 lines 2-21*), a scanning device configured to scan an internal anatomy of the person to obtain scanning data (*col. 3 lines 21-26*), and a computer *20* operably coupled to both the respiratory monitoring device *50* and the scanning device *10* in *Fig. 1*, the computer configured to generate a plurality of cross-sectional digital images based on the scanning data (*col. 3 lines*

26-30), the computer further configured to generate first and second cross-sectional digital image groups associated with the first and second respiratory states, respectively, of the person, the first cross-sectional digital image group including first and second digital images of the plurality of cross-sectional digital images obtained at first and second positions, respectively, along the axis, when the person has the first respiratory state, the second cross-sectional digital image group including third and fourth digital images of the plurality of cross-sectional digital images obtained at third and fourth positions, respectively, along the axis, when the person has the second respiratory state (*col. 6 lines 55-58*), the computer further configured to generate first and second 3-D digital images utilizing the first and second cross-sectional digital image groups, respectively (*col. 6 lines 60-63*). However, the prior art fails to teach the computer further configured to generate a resultant 3-D digital image indicating at least a portion of the internal anatomy of the person utilizing the first and second 3-D digital images, the computer further configured to store the resultant 3-D digital image in a memory device, therefore renumbered claims 25-48 are allowable.

In regards to renumbered claim 49, Takagi et al. illustrates an article of manufacture *10* (*Fig. 1 and col. 3 lines 34-50, in which the following processes are implemented using a computer, or article of manufacture, therefore the following computer implemented process provide code for each process)*, comprising: code for inducing a scanning device to scan the internal anatomy of the person at a plurality of positions along an axis to obtain scanning data (*col. 3 lines 21-26*), wherein the scanning at each position is performed over at least one respiratory cycle of the person (*col. 3 lines 30-33*), code for generating a plurality of cross-sectional digital images based on the scanning data (*col. 3 lines 26-30*), code for generating first

and second cross-sectional digital image groups associated with the first and second respiratory, states, respectively, of the person, the first cross-sectional digital image group including first and second digital images of the plurality of cross-sectional digital images obtained at first and second positions, respectively, along the axis, the when the person has the first respiratory state, the second cross-sectional digital image group including third and fourth digital images of the plurality of cross-sectional digital images obtained at third and fourth positions, respectively, along the axis, when the person has the second respiratory state (*col. 6 lines 55-58*), and code for generating first and second 3-D digital images utilizing the first and second cross-sectional digital image groups, respectively (*col. 6 lines 60-63*), in which Claus et al.(*US 2005/0135558*) teaches a computer storage medium having computer code encoded therein, as (*¶0015 lines 1-13*), for generating a digital image indicative of an internal anatomy (*¶0051 lines 1-10*). However, the prior art fails to teach code for generating a resultant 3-D digital image indicating at 1east a potion of the internal anatomy of the person utilizing the first and second 3-D digital images and code for storing the resultant 3-D digital image in a memory device, therefore renumbered claim 49 is allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art patents and publications on the attached PTO-892 form pertain to generating one or more 3-D images of the internal anatomy of person during respective respiratory states:

- *Solomon US Patent 5,846,204*
- *Bernstein et al. US Patent 6,201,393*
- *Du et al. US Patent 6,292,684*
- *Le et al. US Patent 7,260,444*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Said Broome whose telephone number is (571)272-2931. The examiner can normally be reached on M-F 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571)272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Said Broome/
Primary Examiner, Art Unit 2628